WHY DO SPANISH SAVINGS BANKS INVEST IN THE STOCK CAPITAL OF PUBLICLY TRADED COMPANIES?

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Abstract
By definition, Savings Banks form part of what is known as the social economy, so their investment policies must logically comply with objective efficiency and other more subjective social criteria. However, at different moments in time, accusations have been launched against their investment policies, claiming that they have ignored both the above criteria. The aim of this paper is therefore to empirically determine, based on a samples of publicly traded Spanish companies, whether said claims are founded or not. We use a qualitative dependent variable model (logit) to analyse the variables explaining the investment performance of savings banks compared with regular banks, and between savings banks according to whether the company is publicly traded or not. The results indicate that investment in the publicly trading companies in our sample does not comply with efficiency criteria based on business returns, but is mere speculation aimed at market gains.

Keywords: saving banks, efficiency, investment policy, market.
JEL: C35, G11, G21

1. The situation and the issue under study

In the Spanish financial sector, voices are periodically heard against savings bank investment policy and management. These claims indicate that there is an economic contradiction between efficient savings bank investment management and industrial shares. Economic agents therefore demand more independence between political and economic power in the savings bank sector.

In view of this situation, this paper aims to empirically verify whether these accusations are true or not. It is based on the following assumptions:

- The objectives of savings bank investment policies are two fold: social and economic. Whereas shares in small or medium-sized non-public companies may fulfil these objectives, for social-geographic responsibility reasons, among others, this is not so evident in relation to direct or indirect investments in the capital of publicly traded corporations.
- Investments in publicly traded corporations may be due merely to criteria related to the business management of savings banks, aiming at returns, or to other issues unrelated to logical economic principles. The purpose of the paper, then, is to discover the reasons for said investments, identifying the economic indicators which best explain the investment activities of savings banks; in this case, if the results do not

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follow the expected logic, we can say that the causes explaining such investments are other than economic.

In sum, the hypothesis to be tested (H_0) is: *savings bank investments in the capital of Spanish publicly traded companies are based on objective economic criteria*. If this hypothesis is accepted, the accusations of different agents would be unfounded. However, if the null hypothesis is rejected, the next step would be to identify the subjective criteria governing said investments.
The paper is structured as follows: the second section includes a review of the literature available, the third defined and analyses the study sample, the fourth described the model used to test the hypothesis and the fifth presents the results, followed by our principal conclusions.

2. Literature review

There are few studies on this type of institution and their investment activities on an international scale, which may be due to two reasons: in the first place, because the financial system in the Anglo-Saxon world is based on the existence of capital markets with a high degree of liquidity, compared with continental Europe, where banks and savings banks, besides their traditional business financing function, are directly involved in businesses through shareholdings[1]. Most studies, therefore, hardly refer to the investment function of financial intermediaries, focusing on other aspects which are more relevant for their economies, such as establishing the reasons for the existence of these two financial system models (see Ergungor [2004]), or why investments are made through banks and not directly on the stock exchange (Sevaes and Zenner [1996]), or the advantages derived from a closer relationship between banks and firms than is usual in the United States (Houston and James [2001]). In relation to the British case, an old paper by Brechling (1965) includes a theoretical and empirical analysis of the factors explaining the choice of assets of the country's commercial banks.

The second reason for the scarcity of studies of this kind on an international scale is precisely the peculiar aspects of savings banks. In many economies, this type of financial intermediary does not existence, in others they are of minimal importance and certainly not as significant as they have become, for example, in Spain. Banks have thus become the main subject of study for economies with financial systems based on financial intermediaries. In this respect, the leading attractions for investigators were Germany and Japan[2]. For the German case, studies by Gorton and Scmidt (1996) and Fohlin (1998), analyse the economic and business implications of a universal banking system closely related to industry from different viewpoints, including the historic perspective. On the other hand, Aoki et al (1994) provide an overview of the role of Japanese banks and their investments, whereas Okazaki and Horiuchi (1990) and Hoshi et al (1991) focus on the

[1] In the United States, since the Banking Act of 1933, there are legal constraints to banks' shares in non-financial firms, except when shares are acquired as the result of renegotiating a loan.
[2] Germany, because of the important role played by the banking system in its industrialisation process, and Japan because of the peculiar relationship between banks and industry in its economy, highly questioned since the economic crisis of the nineties.

consequences of the banking system financing leading Japanese industrial groups.In Spain, however, the interest of investigators in savings banks has increased, due both to their increasing importance in our financial system, and to their peculiar aspects, particularly their social orientation. This is evident in abundant literature covering everything from economic history to recent financial and banking economy studies.

From a historic perspective, papers by Tortella (1974), Titos (1991, 1999), Forníes (1991), Tedde (1991, 2001) and Martínez Soto (2000) establish the historic features of Spanish savings banks. More recently, the paper by Martínez Soto and Cuevas (2004) analyses the impact of the institutional framework on the development of Spanish savings banks and their evolution prior to the civil war, also including a comparative analysis with the rest of Europe.Most of this research refers to the investment policies of savings banks. From the 2nd republic to the end of the dictatorship (1931-1975), this policy was characterised by State intervention, according to which these institutions financed the State, the public companies associated to the *Instituto Nacional de Industria*, and firms operating in sectors that the authorities classified as strategic for national development[3].

Besides these general works, there are many local and regional monographs on savings banks. Always from a descriptive perspective, they include analyses of the evolution and direction of the investments made by these institutions over time (see, for instance, López Yepes and Titos Martínez [1995, 2002] and Nadal and Sudriá [1981,1983]), or even their possible implications for regional development (see Cuadrado and Villena [1978]).

Outside the field of Economic History, the bibliography is also abundant, although with descriptive papers still predominant. This group includes papers by Plaza (1993) about the savings bank merger processes taking place after Spain joined the European Union, or by Lagares (1993), Medel (1993), Quintás (1993a) and Martínez Alegría (1994) about the status and perspectives of Spanish savings banks in the early nineties. On the other hand, based on an institutional analysis, Kumbhakar et al (2001) measured the impact of the deregulation of the Spanish financial sector on savings banks in the 1986-1995 period.

Papers by Bustarviejo et al (1991), Quintás (1993b) and Cals (1998) pay more attention to the investment activities of saving banks, analysing aspects such as their role in the financing both of the Spanish economy in general and of private enterprise.More recently, and along the same lines, a special issue of *Economía Industrial* magazine was published in 2001 on banking and industry in Spain. The article by Nieto and Serna (2001) assessed the effect of industrial holdings on banks and savings banks.

When their intermediation margins fell as a result of lower interest rates in the 90's, the two types of financial intermediary reacted by increasing their industrial stock. The main

[3] Intervention in savings bank investments had started with the *Estatuto General de Ahorro Popular* of 1929. Previously, the investment policy of these non-profit making establishments had been characterised by prudence in the acquisition of public securities in view of the distrust that could be created among their depositors by a portfolio containing solely industrial stock; this shows that there has always been concern among economic agents in relation to the investments made by savings banks.

conclusion reached by the authors is that savings banks were capable of obtaining greater returns from their industrial stock than banks, since they decided to acquire shares in non-financial firms with excellent potential for growth and perspectives. In the same magazine, Sanchís and Soriano (2001), reviewed the recent evolution of the Spanish industrial stock held by banks and savings banks. Three other papers provided examples of specific financial intermediaries, confirming what the previous articles were describing from a more general perspective. Evidently connected to this paper is the article by Martínez Vilches (2001) in which he analyses the investment performance of *Caja Madrid*. However, it hardly refers to the issue contemplated here, related to investment in publicly traded companies. The author thus concluded, with no empirical verification, that there were different reasons which could explain the recent investment policy of the Madrid-based savings bank, such as greater stability in its results of a need to increase the scope of its business lines.

3. The sample

In our search for a sample with which to test the hypothesis considered in this study, we made use of the SABI (*Sistema de Análisis de Balances Ibéricos*) database, which contains financial information on over 700,000 Spanish and Portuguese companies. It is updated every six months in relation to its leading financial variables, but company stockholders are those registered the previous financial year. So we can only consider companies in which savings banks and/or banks held shares in the 2004 financial year. This means that the study, and therefore the sample, is a cross section and not a data panel showing evolution over time.

Since our objective is two fold, to compare the investments of savings banks and banks in publicly traded companies and to identify the possible investment criteria differences in public and non-public firms, two samples are constructed.
The first sample (sample A) resulted from applying the following search criteria:

- Companies trading on the stock exchange, given that our hypothesis refers only to this type of firm: 691.
- Spanish nationality: 628.
- With financial information available for financial years 2002 and 2003, since the objective is to verify whether one year's results explain the following year's investments: 111.

Of the 111 final companies, savings banks owned stock capital in 46 of them in 2004, 41.44% of the total sample[4]. In sum, the number of companies in the sample and their shareholdings are shown on Table 1:

[4] The names of the companies included in the sample could be demanded to authors by email.

Table 1. Sample composition

Stock held by	Number	Percentage
Savings banks	7	6.31%
Savings banks and banks	39	35.14%
Banks	23	20.72%
Neither	42	37.84%
Total	111	100.00%

Table 1 shows several interesting factors:

- Savings banks hold stock in less publicly traded companies than banks.
- The publicly traded companies in which banks and savings banks hold shares represent 62.16% of the total. Although this is more than half, there does not appear to be an explanation for this *a priori*, since all the companies in the sample trade on the stock exchange and a higher percentage would be logical in both types of financial institution.

After selecting the companies in the sample, we determined the financial variables that could explain (explanatory variables, *X*) the decision of savings banks to invest in these companies' stock. The justification of the inclusion and estimation of these variables[5] if they are not directly observed, is as follows:

- Relative net turnover variation rate (*CNN(t)*): estimated as the quotient between the variation in net revenue from t-1 to t, and said revenue at t-1. The inclusion of this variable is justified by the fact that a financial institution could be interested in holding shares in a company with heavy revenue increases giving rise to cash inflows which could be managed in accounts and financial operations with said institution.
- Return on assets (economic returns): it will be taken both for financial year t (*RoA(t)*) and t-1 (*RoA(t-1)*), and it is estimated as the quotient between Ordinary Profits before Tax and total assets. Its inclusion is evident, since a financial institution would be expected to invest in companies with growing returns with a view to long-term gains. Whereas the previous variable only represents flow, this one adds costs, and therefore yield.
- Relative variation rate of the number of employees (*V. Empl(t)*): estimated in the same way as net turnover. It is included because of the possibility of the management of payrolls, pension funds and other personnel-related products, and a possible social investment policy in employment-creating companies.
- Capitalisation difference (*Dif_Apal(t)*): capitalisation (indebtedness ratio) is estimated as the quotient between debt capital and equity, so the variable included is the difference between this ratio in financial year t and t-1. Its inclusion is justified by the significance of the indicator itself; an increase represents more indebtedness for each euro of equity, so it would be reasonable to assume *a priori* that a financial institution will hold shares in the stock capital of a company increasing its indebtedness in order

[5] The principal statistics for the companies in which shared are held and for those in which they are not, could be demanded to authors by email. The correlation matrix for the companies in which shared are held could be demanded to authors by email

to participate in the corresponding financial operations, and hence in their subsequent revenue.

- Accounting financial cost: estimated as the quotient of financial costs and total debt capital, for both financial year t (*Cost_fin(t)*) and t-1 (*Cost_fin(t-1)*). This variable is included for similar reasons to those applicable to the indebtedness ratio; in other words, economic criteria.
- Relative rate of variation of weighted market capitalisation (*Dummy_Price(t)*): estimated in the same way as net revenue and taking the value at financial year closure as market value. Weighting means that the variation rate (*V. Price(t)*) will be multiplied by a centred dummy variable, which will be 1 if the financial institution analysed (savings bank, bank or both) holds shares in the company, and –1 if it does not. Its inclusion, and how it is included (weighted by dummy), is justified by the possibility that the institutions studies seek market gains when they invest (speculation) rather than business returns (economic rate of return). Therefore, when we multiply the market returns of companies in which shares are not held by –1 (and those of companies in which shares are held by 1), we are considering that the institutions made a correct decision when investing in some but not in others. This is easily understood is we consider that a negative market gain, for a company in which shares are held, will have a negative influence (wrong decision), whereas in a company in which shares are not held, the incidence will be multiplied by -1 and therefore positive (and the right decision).

The second sample (sample-B) was the result of a new search with the following criteria and results:

- Spanish firms: 838,078.
- With 3 or more employees, to rule out family business with highly concentrated capital: 241,017.
- Shares not trading on the stock market: 240,888.
- Established before the start of the study period (31-Dec-2002): 240,856.
- Only public limited (*sociedad anónima*) companies, to guarantee the free transfer of shares: 50,892.
- Companies operating during the study period, and not under temporary receivership, bankrupt, inactive or in liquidation: 50,325.
- Companies presenting their accounts on the normal model, in order to obtain the accounting information required for the study: 12,321.
- Audit report available to guarantee the accuracy of the accounting information employed: 5,069.
- Companies in which none of their ultimate stockholders or owners are publicly traded, to avoid the possibility of savings banks investing in a firm which is not publicly traded, but of which the parent company is: 522.

Of the resulting total (522 firms), savings banks hold equity in 104, representing 19.92%.

In this case, the regressors were the same as for the publicly traded companies, but, for obvious reasons, replacing the relative variation in the market price of the shares by the years since the company was established, a variable referred to as *Age*. We also included a centred dummy variable with a value of 1 if a savings bank holds equity in the company

and -1 if it does not. The purpose of this dummy is to verify whether, affecting a regressor with it, it could be an explanatory variable of the investment behaviour of savings banks; for instance, *Dummy_V.Empl(t)* would be a variable the value of which would be the relative variation in the firm's number of employees if a savings banks holds equity in it, and -1 if it does not.

4. The model

Given that the variable to be explained (y) is qualitative, that is, the decision to invest or not in a certain firm (i), the choice of model to test the hypothesis is restricted to what are known as latent variable models (probit, logit, multinomial, ordered, conditional, etc.). Within this group, the decision is restricted to two possibilities, probit or logit, because the non-observable variable to be explained can only have two values, investment or no investment. The choice of a probit model means that the phenomenon's probability distribution is normal, whereas the logit model adapts to a logistic. The final decision was based on the results statistics obtained, where we can see how the variables to be used as explanatory do not present individual behaviour according to normal distribution (asymmetry and excess of non-zero kurtosis). This, together with the high kurtosis excesses (greater probability than normal in the distribution tails), leads us to chose the logit model, with more probability in the tails than the normal (probit) alternative.Once we have established the model, we now proceed to its theoretical formulation and a description of its estimation procedure.

Let y be a non-observable or latent dichotomic variable the value of which will be 1 if a certain economic phenomenon (investment) occurs and 0 if it does not. This economic phenomenon (Z) will be explained by a series of variables (X) through a linear relationship, so that U is a threshold such that:

$$\forall i=1,...,n \quad Z_i=\alpha+\sum_{j=1}^{m}\beta_j X_{i,j} \begin{cases} Si\ F(Z_i)\geq U \rightarrow y_i=0 \\ Si\ F(Z_i)<U \rightarrow y_i=1 \end{cases} \tag{4.1}$$

Where i is each of the n firms, j each of the m explanatory variables, F(·) the accumulated probability distribution, in our case a logistic, α is a constant, and β are the parameters showing the incidence of each explanatory variable on the latent one.
The problem in estimating the model lies in the fact that Z is not observable, because what is actually known is a series of investment decisions, so the estimation would be given by:

$$y_i=F\left(\alpha+\sum_{j=1}^{m}\beta_j X_{i,j}+\varepsilon_i\right)=F(Z_i+\varepsilon_i) \tag{4.2}$$

Where ε is the model's estimation residue. Observe that the model is not linear, but a function of a probability distribution. Unlike a simple linear model, this guarantees that the estimated latent variable value is between 0 and 1, although it also means that the parameters cannot be estimated by the standard methods employed in linear models (least squares), so we will have to resort to estimation by the maximum log-likelihood method [Train, 2003: 38-79].

The logistic distribution means that the likelihood (p) of choosing one of the alternatives (A) of investing or not, in any firm i, would be:

$$A=\{0,1\} \quad p_{A,i}=\frac{\exp(Z_i)}{\sum_{s=1}^{n}\exp(Z_s)}=\frac{\exp\left(a+\sum_{j=1}^{m}b_jX_{i,j}\right)}{\sum_{s=1}^{n}\exp\left(a+\sum_{j=1}^{m}b_jX_{s,j}\right)} \tag{4.3}$$

This distribution, therefore, means that e independently follows an extreme distribution, identically distributed (i.i.d.) with variance s^2, so the parameters are estimated as rescaled according to said variance, as follows:

$$\frac{b_j}{b_w}=\frac{\frac{b_j^*}{s}}{\frac{b_w^*}{s}}=\frac{b_j^*}{b_w^*} \tag{4.4}$$

Where j y w represent any two explanatory variables, b the estimated parameters (rescaled), and b^* the originals, so the ratio between the estimated and original parameters is the same; the estimates will therefore indicate the effect of the respective explanatory variable in terms of variance of the non-observable variable.
The log-likelihood function would then be given by:

$$\ln L(a,ß)=\sum_{i=1}^{n}\sum_{A=0}^{1}y_{A,i}\ln(p_{A,i})=\sum_{i=1}^{n}\sum_{A=0}^{1}y_{A,i}\ln\left[\frac{\exp\left(a+\sum_{j=1}^{m}b_jX_{i,j}\right)}{\sum_{s=1}^{n}\exp\left(a+\sum_{j=1}^{m}b_jX_{s,j}\right)}\right] \tag{4.5}$$

Where $y_{A,i}$ will have a value of 1, in our case, if it was decided to invest in firm i, and 0 if it was not. We will use a regular numerical optimisation method to estimate the parameters. In our case, we have chosen BFGS[6] (Broyden-Fletcher-Goldfarb-Shannon) because of its good convergence for the estimated models [see Train (2003)].

5. Results obtained

As a result of the estimation of the logit model for all the explanatory variables proposed and sample-A of publicly traded companies, we obtained the results shown on Table 2:

[6] The estimation was made using the PcGive econometric program.

Table 2. Estimated Logit models for publicly traded companies

Regressors	No shares held (Y = 1)				Savings banks only (Y = 1)			
	Coef.	Std.Error	t-value	t-prob	Coef.	Std.Error	t-value	t-prob
RoA(t)					-36.5040	10.2800	-3.5500	0.0010
Dif_Apal(t)					-1.1310	0.4010	-2.8200	0.0060
Dummy_Price(t)	-9.2710	1.8270	-5.0800	0.0000	9.8410	2.3470	4.1900	0.0000
log-likelihood	-36.7467	states	2		-20.8016	states	2	
observations	111	Param.	1		111	Param.	3	
baseline	-76.9393	Test: Chi^2	80.385 [0.0000]**		-76.9393	Test: Chi^2	112.28 [0.0000]**	
AIC	75.4934	AIC/n	0.6801		47.6032	AIC/n	0.4289	
mean(Y)	0.3784	var(Y)	0.2352		0.0631	var(Y)	0.0591	
Regressors	Banks and savings banks (Y = 1)				Banks only (Y = 1)			
	Coef.	Std.Error	t-value	t-prob	Coef.	Std.Error	t-value	t-prob
RoA(t)					-7.3646	4.1560	-1.7700	0.0790
Cost_fin(t)					-20.0691	10.7200	-1.8700	0.0640
Dummy_Price(t)	9.2710	1.8270	5.0800	0.0000	9.2334	2.0000	4.6200	0.0000
log-likelihood	-36.7467	States	2		-29.4299	states	2	
observations	111	Param.	1		111	Param.	3	
baseline	-76.9393	Test: Chi^2	80.385 [0.0000]**		-76.9393	Test: Chi^2	95.019 [0.0000]**	
AIC	75.4934	AIC/n	0.6801		64.8598	AIC/n	0.5843	
mean(Y)	0.3514	var(Y)	0.2279		0.2072	var(Y)	0.1643	
Regressors	Total savings banks (Y = 1)				Total banks (Y = 1)			
	Coef.	Std.Error	t-value	t-prob	Coef.	Std.Error	t-value	t-prob
RoA(t)								
Cost_fin(t)	-0.4820	0.2720	-1.7700	0.0800				
Dummy_Price(t)	9.7030	1.9300	5.0300	0.0000	9.2710	1.8270	5.0800	0.0000
log-likelihood	-35.3649	states	2		-36.7467	states	2	
observations	111	Param.	2		111	Param.	1	
baseline	-76.9393	Test: Chi^2	83.149 [0.0000]**		-76.9393	Test: Chi^2	80.385 [0.0000]**	
AIC	74.7298	AIC/n	0.6732		75.4934	AIC/n	0.6801	
mean(Y)	0.4144	var(Y)	0.2427		0.5586	var(Y)	0.2466	

Having estimated the models, we can obtain the probabilities (*U*) enabling us to discriminate between the decision to invest or not, which in each case has been applied for each institution. Their values are shown on
Table **3**:

Table 3. Probabilities estimated for the states (*U*) of publicly traded companies

Sample	States	Count	Frequency	Probability	loglik
No shares held (Y = 1)	0	69	0.6216	0.5778	-20.7900
	1	42	0.3784	0.4222	-15.9600
	Total	111	1.0000	1.0000	-36.7500
Savings banks only (Y = 1)	0	104	0.9369	0.8562	-18.4800
	1	7	0.0631	0.1438	-2.3250
	Total	111	1.0000	1.0000	-20.8000
Total savings banks (Y = 1)	0	65	0.5856	0.5493	-22.3700
	1	46	0.4144	0.4507	-13.0000
	Total	111	1.0000	1.0000	-35.3600
Banks and savings banks (Y = 1)	0	72	0.6487	0.5857	-25.0000
	1	39	0.3514	0.4143	-11.7400
	Total	111	1.0000	1.0000	-36.7500
Banks only (Y = 1)	0	88	0.7928	0.7661	-15.0900
	1	23	0.2072	0.2339	-14.3400
	Total	111	1.0000	1.0000	-29.4300
Total banks (Y = 1)	0	49	0.4414	0.4654	-17.4200
	1	62	0.5586	0.5346	-19.3300
	Total	111	1.0000	1.0000	-36.7500

Thus, for example, with regards to firms in which no stock is held, if the accumulated probability (logistic) of *Z* for a firm *i* is 0.5778 or more, the expected value of *y* would be 0, whereas if it is less (within the remaining 0.4222), the expected value would be 1, and in the first case banks or/and savings banks would hold shares, whereas in the second case they would not. To confirm the model's accuracy, that is whether it indeed conveniently explains the sample, we obtained the number of states 0 and 1 observed, and those expected for each estimated model. The values are shown on Table 4:

Table 4. Observed and forecast values for the sample of publicly traded companies

Sample	States	State 0	State 1	Sum actual
No shares held (Y = 1)	State 0	60	9	69
	State 1	7	35	42
	Sum forecast	67	44	111
Savings banks only (Y = 1)	State 0	97	7	104
	State 1	1	6	7
	Sum forecast	98	13	111
Total savings banks (Y = 1)	State 0	56	9	65
	State 1	6	40	46
	Sum forecast	62	49	111

Banks and savings banks (Y = 1)	State 0	63	9	72
	State 1	6	33	39
	Sum forecast	69	42	111
Banks only (Y = 1)	State 0	83	5	88
	State 1	7	16	23
	Sum forecast	90	21	111
Total banks (Y = 1)	State 0	43	6	49
	State 1	9	53	62
	Sum forecast	52	59	111

As Table 4 shows, the values in bold text would represent the model's forecasting errors. In other words, for instance, in the case of investment by savings banks only, there was 1 company that was state 1 which, according to the model, should have been state 0, and there were also seven state 0 companies that the model forecasted as 1.

Finally, since this is not a linear model, so the incidence of each explanatory variable on the result cannot be observed directly, but through the derivative of the model in relation to each regressor, considering the rest constant (the value taken for each regressor was its mean), these derivatives were estimated and are shown on Table 5:

Table 5. Derivatives in relation to the mean of the regressors in the sample of publicly held companies

Sample	Regressors	State 0	State 1
No shares held (Y = 1)	Dummy_Price(t)	2.1631	-2.1631
Savings banks only (Y = 1)	RoA(t)	0.2111	-0.2111
	Dif_Apal(t)	0.0065	-0.0065
	Dummy_Price(t)	-0.0569	0.0569
Total savings banks (Y = 1)	Dif_Apal(t)	0.1157	-0.1157
	Dummy_Price(t)	-2.3312	2.3312
Banks and savings banks (Y = 1)	Dummy_Price(t)	-2.0135	2.0135
Banks only (Y = 1)	RoA(t)	0.0001	-0.0001
	Cost_fin(t)	0.0004	-0.0004
	Dummy_Price(t)	-0.0002	0.0002
Total banks (Y = 1)	Dummy_Price(t)	-2.3009	2.3009

From the above estimations, we can see that the key variable in the choice to invest in the capital of publicly traded companies is variation in market prices, both for savings and regular banks.

However, when we distinguish the companies in the sample in which savings banks hold stock and banks do not, we have to add economic return and variation in indebtedness, both of them with a negative impact. In other words, whereas companies in which stock prices have increased in the 2003 financial year compared with 2002, are clear candidates for savings bank investment, the same is also true of those who also present declining returns and indebtedness; this may be because savings banks make two types of choice, one for speculative reasons, with good market returns, and others for salvage purposes, in companies with low operating profits (in 2003) but good future cash flow projections: They probably consider that they are undervalued, and the savings banks concerned would go from being creditors to owners, explaining why they invest in firms with declining indebtedness.

On the other hand, like savings banks, regular banks also invest in firms with good market returns, but when we analyse the companies where banks, but not savings banks, are present, another two regressors also appear, economic return and financial cost, both related to the last financial year (2003). As we can see, whereas indebtedness and not financial cost explains the investment policy of savings banks, this is not true for banks. This means that banks invest in the stock capital of publicly traded firms which have gained in value, with low economic returns (and therefore cheap) and with low financial costs, since they have a negative impact on the explained variable. Banks not only seek to speculate, like savings banks, but they also remember what their main business is, investing in companies which, in view of their low financial costs, still have room to grow in this sense and therefore represent a good business opportunity.

Finally, with regards to the estimation of the model, we calculate its level of explanation, using a likelihood ratio index (r) [see Train, 2003:72] so that:

$$r = 1 - \frac{LL(q^*)}{LL(0)} \tag{5.1}$$

Where $LL(q^*)$ represents the optimal log-likelihood value, whereas it is $LL(0)$ when all the θ parameters of the explanatory variables are zero; this is also known as baseline log-likelihood (estimated on Table 2). This indicator is similar to R^2 in a linear regression; indeed it is bound in the same way. The values obtained for each model are shown on Table 6:

Table 6. Goodness of fit of the estimated models

Sample	log-likelihood	baseline log-like	r
No shares held (Y = 1)	-36.7467	-76.9393	52.24%
Savings banks only (Y = 1)	-20.8016	-76.9393	72.96%
Total savings banks (Y = 1)	-35.3649	-76.9393	54.04%
Banks and savings banks (Y = 1)	-36.7467	-76.9393	52.24%
Banks only (Y = 1)	-29.4299	-76.9393	61.75%
Total banks (Y = 1)	-36.7467	-76.9393	52.24%

On the other hand, most of the forecasting errors in which the two models incur can be explained; and in the cases where savings banks invested although they were forecast not to, there are important regional connections that would explain this off-model behaviour. This applies, for example, to *Minero Siderúrgica de Ponferrada, S. A.*, a mining concern operating in the León region, shares of which are held by the most important savings bank in the area, *Caja España*[7]. There are another four similar cases, with investments in *compañía de Aguas de Sabadell, Aguas de Valencia, Tubos Reunidos*[8] and *Sotogrande*. The model establishes that there should be no investment in these companies, but both savings banks and banks hold shares in all of them. In the first three cases, the regional connection could explain the savings bank investments, instead of the possibility of high returns, as the model established, since their stockholders include the most important savings banks of their respective regions or towns: *Caja de Ahorros de Sabadell, Bancaja* and *Caja Vital*, respectively[9].

According to the model, neither should *Caja Madrid* have invested in *Sotogrande*, a real estate company operating in southern Spain. In this case, the "regional" exception evidently fails to explain this forecasting error. The reason, however, why the Madrid savings banks decided to acquire 17.3% of the stock capital of *Sotogrande* becomes somewhat clearer when we observe that the majority stockholder is *NH Hoteles*, a firm in which *Caja Madrid* owns a significant investment (around 5%)[10]. In this case, therefore, the forecasting error would be explained by the connection between two companies.

The case of *Seda de Barcelona* and *AYCO* is similar, with stock held by both banks and savings banks, so they are included in the model constructed to explain investments by both types of institution in publicly traded companies. The model establishes that they should not have invested in them. However, another forecasting error appears in the model constructed for companies in which only savings banks hold stock, where the model forecast state 1 and the actual state is 0 (no investment). In this case, since savings banks did buy shares in these companies, and although they were not included in the first model (savings banks only) because banks also invested, the forecasting error would apply to the behaviour of the latter, and not to the savings banks, which acted as forecast (investment).

In the rest of the cases, no reason has been found, *a priori*, for the forecasting errors made by the models. However, note that all these errors for which there is no explanation are state 0, when they should have been state 1. In other words, they are situations where savings banks should have invested, but failed to do so. If we assume that savings banks do not have unlimited resources and have to choose between different investments, approving some and rejecting others, these errors could represent those situations in

[7] Caja España is the result of the merger of *Ca y MP de Palencia, CA and MP de Leon, CA Popular de Valladolid, CA Provincial de Valladolid* and *CA Provincial de Zamora*.
[8] *Tubos Reunidos, S. A.* is a company registered in Amurrio, a town in Alava.
[9] *Bancaja* is the savings bank resulting from the merger of the savings banks of Valencia, Castellon and Alicante, whereas *Caja Vital* resulted from the merger of the savings banks of Vitoria and Alava.
[10] In this case, the savings bank's investment in *NH Hotels* is correct according to the model.

which savings banks did not invest even though they should have, merely because of budgetary constraints.

Finally, Table 7 presents the percentage shares of savings banks (or banks, when applicable) in the companies with forecasting errors:

Table 7. Share in companies with forecasting errors

Company	Stock held by	% share
AGUAS DE VALENCIA	Banco de Valencia	19.11%
	Bancaja	8.88%
AYCO GRUPO INMOBILIARIO	CA y MP de las Baleares	41.70%
	Caja España	19.54%
	CA de Santander y Cantabria	No data available[11]
	Unicaja	No data available
	Barclays Bank	No data available
CINSA	Unión de Bancos Suizos	5.90%
COMPANYIA D'AIGUES SABADELL	Caixa d'Estalvis de Sabadell	5.80%
	Banco de Sabadell	5.32%
LA SEDA DE BARCELONA	Societé Generale	11.00%
	Caja de Ahorros de Cataluña	4.26%
	Banesto	1.00%
	BSCH	0.90%
MINERO SIDERÚRGICA PONFERRADA	Caja España	No data available
RUSTICAS	Deutsche Bank Suisse	No data available
SOTOGRANDE	CA y MP de Madrid	17.27%
	BBVA	No data available
TUBOS REUNIDOS	BBVA	24.26%
	Caja Vital	3,00%

To complete the results of comparing investment in the stock capital of publicly traded companies by savings banks versus banks, we also estimated a similar model for investment in the capital of non-publicly traded firms by savings banks (sample-B), in order to see whether investment policy differs in this case. The regressors and their resulting (statistically significant) parameters are shown on Table 8:

As Table 8 shows, and applying (5.1), the goodness of fit of this model is 69.51%. The probabilities (*U*) enabling is to discriminate between the decision to invest or not in non-publicly held companies by savings banks are shown on Table 9:

[11] In the SABI database.

Table 8. Logit model estimated for non-publicly traded companies

Regressors	Shares held (Y = 1)			
	Coefficient	Std.Error	t-value	t-prob
Age	-0.0415	0.0078	-5.2900	0.0000
Dummy_RoA(t)	5.5148	3.1200	1.7700	0.0780
Dummy_RoA(t-1)	7.0666	2.8940	2.4400	0.0150
Dummy_Cost_fin(t-1)	75.6067	9.7300	7.7700	0.0000
log-likelihood	-110.3163	states	2	
observations	522	parameters	4	
baseline log-like	-361.8228	Test: Chi^2	503.01 [0.0000]**	
AIC	228.6326	AIC/n	0.4380	
mean(Y)	0.1992	var(Y)	0.15954	

Table 9. Probabilities estimated for the states (*U*) of non-publicly traded companies

States	Count	Frequency	Probability	loglik
0	418	0.8008	0.8077	-24.98
1	104	0.1992	0.1924	-85.34
Total	522	1	1	-110.3

Forecasting successes and errors are shown on Table 10:

Table 10. Observed and forecast values for the sample of non-publicly traded companies

States	State 0	State 1	Sum actual
State 0	418	0	418
State 1	14	90	104
Sum forecast	433	89	522

The derivatives in relation to the regressors are shown on Table 11:

Table 11. Derivatives in relation to mean regressors in the sample of non-publicly traded companies

Regressors	State 0	State 1
Age	0.0080	-0.0080
Dummy_RoA(t)	-1.0646	1.0646
Dummy_RoA(t-1)	-1.3642	1.3642
Dummy_Cost_fin(t-1)	-14.5960	14.5960

In this case, as Table 8 and Table 11 show, in relation to non-publicly traded companies, savings banks invest in young firms (age has a negative impact), with a positive evolution (in 2002 and 2003) of the economic or operating returns, and fundamentally with high financial costs in 2002. In this case, therefore, savings banks are seeking young companies which could require economic resources in order to expand, are profitable enough to meet their financial commitments (positive economic return) and

have high financial costs; in sum, savings banks want to own shares in non-publicly traded companies with this profile in order to make the most of the business opportunity that their financial costs represent; they acquire equity in such firms in order to guarantee a share both in these costs and in the possible future projection of young and profitable enterprises.

Finally, it is important to note that this model incurs in no forecasting errors for situations in which there should have been no investment. All the investments made by savings banks in non-publicly traded companies follow the logic established by the model. The 13% of errors committed by the model when forecasting the investment behaviour of savings banks refer to companies in which they should have invested (according to the model) but they failed to do so (state 0). Once again, as in the case of publicly traded companies, we must remember that there may be a large number of young companies in which the evolution of their economic returns is positive, they do not trade on the stock exchange and they have high financial costs. This case could be similar to the previous one in that savings banks have limited investment resources, so they have to choose where to use them.

6. Conclusions

Why do Spanish savings banks invest? From the time they were established in the early 19th century, they typically made safe investments with low returns, basically public debt, in order to ensure their depositor's trust. In the 1930's, this situation led to the regulation of the investments made by these financial institutions, with the State providing an important source of resources by Law. Intervention increased during the dictatorship and savings banks were also forced to invest in sectors and companies identified by the authorities as being of key importance for national development. Currently, however, there are no legal constraints to savings bank investments and this, together with their growing importance, has made them key agents in the financing of the Spanish economy and private enterprise; hence our interest in discovering whether this aspects of their business is based on objective or subjective economic criteria.

We have therefore presented a latent variable logit model which attempts to describe the investment behaviour of Spanish savings banks. The explanatory variables used refer to the most important financial aspects of the different companies included in the sample which could affect the investment decision of any economic agent.

According to the model, the behaviour of savings banks in relation to investments in publicly traded firms is not only different from that of regular banks, but also partly fails to comply with their initial social objectives. Whereas banks invest in companies of increasing value with low financial costs, with a view to obtaining more business (credit), savings banks not only make salvage investments (in compliance with their social objectives) but also speculate. Only in 5 cases did savings bank investments respond to subjective criteria not explained by the model, such as regional connections (they invest in companies in which they should not normally hold shares because they are in the same geographical area) or business relations (they acquire stock in a company which in turn is partly owned by another of their leading customers, in which they also own shares).

On the other hand, savings banks aim their investments at young non-publicly traded companies, with a positive evolution and high financial costs, seeking high future returns and the business opportunities that these financial costs represent. Once again, their social objectives play a secondary role to the economic aspects guaranteeing a high return on investment. The models are very reliable, so their forecasting errors, as in the case of publicly traded companies, could be due to the limited resources of savings banks, forcing them to choose between different investment alternatives, accepting some and rejecting others.

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